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A note on *Pteropus* (Chiroptera: Pteropidae) from the Andaman Islands

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A small collection of specimens of *Pteropus* from the Andaman Islands confirms the view that *P. tytleri* Mason, 1908 should be considered a subspecies of *P. melanotus*, and that *P. satyrus* Andersen, 1908 from the outlying island of Narcondam is also subspecifically related to *melanotus* rather than to *P. hypomelanus* with which it had been provisionally associated hitherto, being linked to *tytleri* from the principal islands of the Andamans by specimens from the geographically intermediate island of Barren. Parallelism in colour variation is demonstrated between *P. melanotus* from the Nicobar and Andaman Islands and *P. hypomelanus geminorum* from the islands of the Mergui Archipelago.

Two indigeneous forms of *Pteropus* are listed currently from the Andaman Islands, namely *P. tytleri* Mason, 1908, described from Rutland Island and considered to occur throughout the major part of the archipelago, and *P. satyrus* Andersen, 1908 from the outlying island of Narcondam. Although the genus has long been known to occur in the Andamans, relatively few specimens have been obtained, ever since Mason (1908) made the first critical examination of Andamanese examples, recognising *tytleri* but with the exclusion of *satyrus*, described almost concurrently and of which Mason was clearly unaware. The current classification of the two forms is based on the classic monograph of the Megachiroptera by Andersen (1912) who placed *tytleri* in the *melanotus* group with *melanotus* from the Nicobar Islands, *niadicus* from Nias Island, off Sumatra, *modiglianii* from nearby Enggano Island and *natalis* from Christmas Island, south of Java, and who associated *satyrus* with the *hypomelanus* group, widely distributed throughout Indo-Australia.

Chasen (1940 : 24) considered the purely Malaysian members of the *melanotus* group to be subspecies of *melanotus* with the comment (p. 29) that although ' from *Pteropus melanotus* to *natalis* is a long stretch .... the appearance of the intervening forms provides sufficient grounds to justify the use of a trinomial.' Following this lead, Ellerman & Morrison-Scott (1951 : 96) and later Hill (1968 : 3) listed *tytleri* as a provisional subspecies of *melanotus*. Ellerman & Morrison-Scott (p. 95) thought that from descriptions *satyrus* was very close to *hypomelanus*, of which they listed it as a provisional subspecies, a course subsequently adopted by Hill (p. 2). The relationships of the two forms are thus sufficiently uncertain that it is of considerable interest to report material obtained during successive visits by Mr. Humayun Abdulali to South Sentinel, Barren and Narcondam Islands in the Andaman Archipelago. The majority of these specimens remain the property of the Bombay Natural History Society, but the Society has generously agreed that duplicate examples should remain in the collections of the British Museum (Natural History).

Pteropus melanotus tytleri Mason, 1908

Pteropus tytleri Mason, 1908 : 162, Rutland Island, South Andaman Islands,

2♀♀ AN3, AN6, 1 immature ♀ AN5. South Sentinel Island, South Andaman Islands.

2♂♂ 9/70, 11/70; 2♀♀ 10/70, 12/70. Barren Island, Andaman Islands. 30th April 1970.

Included by early authors with specimens from the Nicobar Islands as *P. melanotus* Blyth, 1863 or *P. nicobaricus* Zelebor, 1869, Andamanese examples were separated as *tytleri* by Mason [Dobson had earlier (1876 : 189) invalidly applied this name] chiefly on account of the sexual colour dimorphism which they display and which apparently does not occur in *melanotus*. Andersen (1912 : 227, 820) gave further descriptions of *tytleri*, pointing out (p. 820) that it could be distinguished from *melanotus* by its much darker underparts. Few specimens have been collected since Mason described *tytleri* and Andersen reviewed it : during the intervening years the holotype and one other specimen from the original material examined by Mason have been added to the collections of the British Museum (Natural History), together with two skulls lacking skins from Rutland Island and South Sentinel Island, and three other specimens, one of these from Port Blair, South Andaman Island, the others from Car Nicobar, all three coming from the Mason Collection but collected many years after his description of *tytleri*.

Males (B.M. 10.7.26.1, the holotype B.M. 13.4.6.6) from Rutland Island have the back and rump blackish brown, lightly streaked with grey, with a dark blackish brown head, sprinkled with a few grey hairs. The mantle is ochraceous buff and very clearly demarcated from the head and back. The ventral surface is dark brown or blackish brown and lacks any paler mid-ventral area, which is represented only by a small area of hairs tipped with brighter chestnut brown. A young male (B.M. 13.4.6.5) from Rutland has a dark reddish brown mantle but otherwise exactly resembles the adult. A female (B.M. 13.4.6.7) from Rutland is uniformly dark both above and below, the mantle indicated only by a tinge of rufous. The two adult females from South Sentinel Island, collected by Mr. Abdulali, conform to the female from Rutland Island, but one (AN6) has a small mid-ventral patch of buff tipped hairs, while the immature female from South Sentinel is exactly like the young male from Rutland except only for the presence of a similar mid-ventral patch. A female (B.M. 34.7.2.24) from Port Blair, South Andaman Island has the back more liberally streaked with grey and has a browner, slightly more prominent mantle than do females from Rutland or South Sentinel. A young adult male (B.M. 34.7.2.23) from Car Nicobar is similar in most respects to adult males from Rutland but has a brown head, lacking any grey, and the mantle is dark reddish brown, closely similar to the mantle in young specimens from Rutland and South Sentinel. This specimen, which lacks a skull, is from the Mason Collection and has been labelled ' *tytleri* ' by Mason. A second specimen (B.M. 34.7.2.56) from Car Nicobar is also from the Mason Collection and has been labelled ' *Pteropus* n. sp. ' by Mason. It is an unmade skin in poor condition, with the skull *in situ*, and is very similar to the last but has a paler, more buffy mantle, a poorly defined buffy crown and nape patch and a small ochraceous mid-ventral area.

Mason (1908 : 163) remarked that *tytleri* occurs on Barren Island, where according to this author it shows a tendency to become smaller and to deviate from typical specimens by having a light and conspicuous oval-shaped area of greyish hairs occupying the chest and belly. The four specimens collected on Barren Island by Mr. Abdulali have the back and rump blackish, streaked with grey. The head and nape is similar in colour : a buffy crown and nape patch is present in males but not in females. Males have a prominent pale ochraceous buff or pale rufous mantle : in females the mantle is dark rufous brown or dark brown. The ventral surface in males is reddish brown anteriorly with blackish flanks and anal region but mid-ventrally is markedly paler, in one example (11/70) exactly like B.M. 34.7.2.56 from Car Nicobar, in the other (9/70) more extensively pale, the centre of the pale area becoming fawn to drab as in the specimens from Narcondam discussed below. Both female specimens from Barren are almost uniformly black ventrally, as in *tytleri*, the mid-ventral region bearing only a few ochraceous-tipped or rufous-tipped hairs. Specimens from Barren Island approach *satyrus* from Narcondam in some points of coloration, but are referred to *tytleri* chiefly on account of their larger size (Table 1) and especially larger teeth (Table 2).

TABLE 1

MEASUREMENTS (IN MILLIMETRES) OF ADULTS OF *Pteropus melanotus* FROM THE NICOBAR AND ANDAMAN ISLANDS

Number	Sex	Length of forearm	Greatest length of skull	Condylobasal length	Palatal length	Least interorbital width	Postorbital width	Zygomatic width	Width of braincase	Mastoid width	c^1—c^1	m^1—m^1	c—m^2	Length of mandible	c—m^3	Locality
P. m. melanotus																
85.8.1.99	—	157	—	—	—	8·7	6·6	—	—	—	13·8	18·5	27·5	55·2	30.8	' Nicobars '
85.8.1.108	♂	163	—	—	42·5	9·7	—	—	—	—	13·8	18·8	28·3	53·6	30·6	Trinkut
85.8.1.107	♀	154	—	—	40·1	9·2	8·0	—	23·7	—	13·8	19·6	27·6	52·0	29·6	,,
P. m. tytleri																
13.4.6.6 Holotype	♂	—	—	—	39·3	9·6	7·4	40·3	—	—	13·1	17·9	27·1	53·8	30·5	Rutland
10.7.26.1	♂	—	—	—	40·1	9·5	7·7	—	—	—	13·7	18·4	27·6	55·0	30·8	,,
13.4.6.7	♀	147	—	—	—	9·5	7·5	37·8	—	—	12·7	18·5	—	53·1	29·8	,,
26.10.8.10	—	—	67·3	66·8	39·3	8·9	6·9	37·2	23·0	21·6	12.7	18·2	25·4	51·4	28·1	,,
26.10.8.11	—	—	72·3	70·8	40·8	10·1	7·5	38·3	23·6	23·1	13.0	18·6	27·4	56·6	30·7	South Sentinel
AN3	♀	149	No skull													,, ,,
AN6	♀	148	No skull													,, ,,
34.7.2.24	♀	148	66·1	63·8	38·0	8·6	7·1	—	23·1	21·2	11·7	17·6	24·5	50·6	28·0	South Andaman
11/70	♂	141	—	—	37·7	8·9	—	—	—	—	11·8	17·5	24·7	50·3	28·8	Barren
10/70	♀	141	—	—	—	8·5	7·7	30·7	21·6	19·8	10·7	17·7	24·0	48·7	27·3	,,
12/70	♀	—	65·6	—	38·5	8·8	8·3	31·2	21·8	19·7	11·3	16·3	24·7	49·8	27·5	,,
P. m. satyrus																
6.9.1.1 Holotype	♂	137	61·3	—	35·2	8·4	6·9	—	—	—	10·8	16·3	23·0	46·6	26·6	Narcondam
AN12	♂	125	60·0	59·2	34·0	8·1	7·3	—	—	—	10·8	16·5	22·5	45·4	25·2	,,
AN15	♀	—	59·2	—	33·3	8·0	8·6	30·1	21·7	18·7	10·0	15·6	22·7	44·6	25·1	,,

TABLE 2

MINIMUM, MAXIMUM AND MEAN MEASUREMENTS (IN MILLIMETRES) OF UNWORN TEETH OF *Pteropus melanotus* FROM THE NICOBAR AND ANDAMAN ISLANDS

		P. m. melanotus	*P. m. tytleri*		*P. m. satyrus*
			Andaman Islands	Barren Island	
Number of specimens		6	5	3	5
pm^3	Length	4.8 - 5·0 (4·9)	4·3 - 4·7 (4·4)	4·2 - 4·7 (4·4)	3·5 - 3·8 (3·6)
	Width	3·2 - 3·5 (3·4)	3·0 - 3·4 (3·2)	3·0 - 3·1 (3·0)	2·6 - 2·8 (2·7)
pm^4	Length	4·6 - 5·0 (4·9)	4·3 - 4·6 (4·5)	4·0 - 4·4 (4·2)	3·7 - 4·1 (3·9)
	Width	3·4 - 3·8 (3·6)	3·3 - 3·5 (3·4)	3·2 - 3·3 (3·2)	2·8 - 3·0 (2·9)
m^1	Length	5·5 - 5·9 (5·7)	5·0 - 5·5 (5·2)	4·8 - 5·2 (5·0)	4·4 - 4·8 (4·6)
	Width	3·1 - 3·4 (3·2)	2·9 - 3·2 (3·1)	2·8 - 2·9 (2·9)	2·5 - 2·8 (2·7)
pm_3	Length	4·8 - 5·4 (5·0)	4·4 - 4·9 (4·6)	4·3 - 4·4 (4·4)	3·7 - 3·9 (3·8)
	Width	2·9 - 3·0 (3·0)	2·6 - 2·9 (2·8)	2·5 - 2·7 (2·6)	2·3 - 2·5 (2·4)
pm_4	Length	4·6 - 4·8 (4·7)	4·1 - 4·5 (4·4)	4·1 - 4·2 (4·1)	3·7 - 3·8 (3·8)
	Width	2·9 - 3·4 (3·1)	2·8 - 3·2 (2·9)	2·8 - 2·9 (2·8)	2·5 - 2·7 (2·6)
m_1	Length	4·6 - 5·0 (4·9)	4·3 - 4·8 (4·6)	4·3 - 4·5 (4·3)	4·0 - 4·2 (4·0)
	Width	2·8 - 3·2 (3·0)	2·7 - 3·0 (2·8)	2·6 - 2·7 (2·7)	2·3 - 2·5 (2·4)
m_2	Length	3·5 - 3·9 (3·7)	3·3 - 3·7 (3·6)	3·2 - 3·4 (3·3)	3·0 - 3·3 (3·2)
	Width	2·7 - 2·9 (2·8)	2·4 - 2·8 (2·6)	2·4 - 2·5 (2·4)	2·2 - 2·3 (2·3)

Hitherto, large *Pteropus* from all of the Nicobar Islands have been referred to *P. m. melanotus* Blyth, 1863, with *P. nicobaricus* Zelebor, 1869 (the name in common use until Mason wrote in 1908) from Car Nicobar in its synonymy. Specimens from Trinkut and Great Nicobar are available in the collections of the British Museum (Natural History) and have been described in detail by Andersen (1912 : 224). They differ from *P. m. tytleri* in having the head generally browner and less blackish grey, in the presence of a more evident reddish mantle in females and in a much paler and brighter ventral surface in both males and females : the paler area varies in colour from golden ochraceous buff to tawny, sometimes medianly faintly drab. Such specimens have been presumed hitherto to occur on Car Nicobar, apparently since Mason (1908 : 161) examined the holotype of *nicobaricus* and associated it with *melanotus*. However, the two specimens from Car Nicobar examined during the preparation of these notes seem to link *tytleri* to *melanotus*. Both have brownish rather than blackish grey heads : one, a young adult male, (B.M. 34.7.2.23) has a dark reddish brown mantle and uniformly dark underparts, while the other (B.M. 34.7.2.56) has a brighter mantle and ochraceous buff to rufous buff mid-ventral patch similar in colour to that of *melanotus* but less extensive. Comparison with the description by Zelebor (1869 : 11) suggests that *nicobaricus* may refer to such a specimen '. . . . the throat, the ventral surface and the anal region dark blackish brown, the occiput, the nape, the sides of the neck and shoulders are a shining glossy reddish fawn with rusty brown border. The individual hairs of the glossy mantle are fawn at the root, glossy reddish at the tip with a golden lustre. The central part of the chest and the upper abdomen is blackish umber brown with fawn and glossy rust red hair tips.' Clearly, the precise allocation of *nicobaricus* must await a re-examination of the holotype in the Naturhistorisches Museum, Vienna but in the meantime the close agreement in size between *melanotus* and *tytleri*, combined with a similar colour pattern which differs only in the greater degree of melanism exhibited by *tytleri* suggests that the two must be considered conspecific. There remains the possibility that pale-bellied *melanotus* may co-exist on Car Nicobar with dark bellied *tytleri*, a point to be resolved only by further collecting on that island or perhaps from the holotype.

Pteropus melanotus satyrus Andersen, 1908

Pteropus satyrus Andersen, 1908:362. Narcondam Island, Andaman Islands.
1♂ 8/70 (AN12) ; 3♀♀ 5-7/70 (AN13-15). Narcondam Island. 29th April 1970.

As long ago as 1906 Osmaston noted (p. 622) of Narcondam Island 'Among mammals I found two species of Fruit Bats. The Nicobar Flying Fox (*Pteropus nicobaricus*) and another smaller species.' Andersen, describing *P. satyrus* (which may be the Nicobar Flying Fox alluded to by Osmaston) was evidently unaware of this reference and later (1912 : 142) suggested that the affinities of *satyrus* lay with *P. hypomelanus*. Specimens obtained from Narcondam by Mr. Abdulali are similar in colour to the holotype of *satyrus*, with blackish back and rump overlaid with a sprinkling of grey, the head mixed black and grey, with a patch of buff on the crown and nape. The male differs from the reputedly male holotype in its much paler mantle which is greatly lightened with buff to the bases of the hairs, in contrast to the dark chestnut mantle of the holotype in which buff based hairs are found only in its posteriormost part. The three rather younger female examples have the back and rump more generously sprinkled with grey than does the male specimen and the mantle is browner, largely lacking red, the individual hairs brownish to the base. In both male and female the anterior part of the ventral surface is reddish brown, the flanks and anal region blackish grey, with a paler mid-ventral brownish buff area, lightening to drab at its centre. These specimens are smaller (Table 1) and have smaller teeth (Table 2) than *P. m. tytleri*.

Andersen (1912 : 142) thought that *satyrus* was most nearly related to *P. hypomelanus geminorum* from the Mergui Archipelago. However, in colour, size and tooth dimensions it is linked to *P. melanotus tytleri* by specimens from Barren Island which although nearer to *tytleri* are nevertheless intermediate between the two forms, and accordingly *satyrus* is considered to be a subspecies of *P. melanotus*. It is worth noting in this connection that the combined colour variation of *P. m. melanotus*, *P. m. tytleri* and *P. m. satyrus* is closely paralleled by similar variation in the series of *P. hypomelanus geminorum* in the British Museum (Natural History) from the islands of the Mergui Archipelago, even in specimens of *geminorum* from a single island. For example, in a series (B.M. 23.1.6.13-20) from Malcolm Island, the back and rump vary from blackish brown in males to predominantly greyish in females : a similar variation occurs in the coloration of the head, sometimes with an extensive buffy suffusion of the crown and nape in males. The mantle in male specimens varies from ochraceous brown or dark rufous to blackish brown and in females from ochraceous brown to dark chestnut brown. The ventral surface in two males has an extensive paler median area exactly as in *P. m. melanotus* and yet in two other male examples and in two females is uniformly dark brown or blackish brown as in *P. m. tytleri*, while two further female specimens are more greyish ventrally. Similar variation is found in specimens from the other islands of the Mergui Archipelago and the similarity in colour variation suggests that possibly *P. hypomelanus* and *P. melanotus* are more closely linked than is apparent from Andersen (1912). However, the status of the poorly known *P. faunulus* from Car Nicobar (thought by Anderson (p. 143) to represent *hypomelanus*) requires to be resolved before this point can be properly determined : furthermore, *niadicus* from Nias Island and *modiglianii* from Enggano (where it occurs with a presumed subspecies of *hypomelanus*, *P. h. engganus*) are also poorly known and further specimens seem essential to any study of the *melanotus* group as it is defined by Andersen.

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